RESEARCH REPORT

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Subject:	Public Health Foodborne Illness Investigators Staffing Study
To:	David Smith, County Administrative Officer
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Issue:

How many communicable disease/foodborne illness investigators are needed to effectively investigate foodborne illness cases and outbreaks in Maricopa County?

Background:

The Public Health Department has expressed concern that the number of cases of foodborne illnesses specifically, and communicable diseases in general reported exceeds current staffs ability to properly investigate. Public Health submitted a request for additional staffing for its Communicable Disease Surveillance program as a budget issue in its annual budget requests for FY 1998-99 and again in FY 1999-00. OMB did not recommend additional funding for the program during FY 1998-99 but did provide an additional $50,000 for the Surveillance program during this fiscal year with an understanding that an additional $50,000 would be made available if the need was validated. That is the purpose of this report.

During the FY 1999-00 budget cycle a discussion was started about the validity of using a foodborne illness fee. At that time Public Health proposed a fee to be paid by those facilities which require a food permit to also pay a foodborne illness fee which be used to offset some of the cost of maintaining a foodborne illness program. Although recommended by the County Board of Health, the fees were not ultimately approved.

Most public health organizations consider foodborne illness of microbial origin as the most serious food safety problem in the United States.[1] The Centers for Disease Control and Prevention (CDCP) reports that 79% of foodborne illness outbreaks were bacterial; with improper holding temperature and poor hygiene of food handlers the most prevalent cause. The term "foodborne disease" encompasses a variety of clinical and etiologic* conditions and describes a subset of enteric disease, which in the United States ranks second in prevalence to respiratory disease[2]. In most cases, the clinical conditions usually associated with it are acute: diarrhea, vomiting, or other gastrointestinal manifestations such as dysentery. According to many scientists and medical doctors, the complexity of

* The medical science concerned with the causes and origins of diseases.

foodborne pathogens, and their ability to cause acute illness and sometimes chronic complications is becoming increasingly worrisome.

The deadly serious nature of foodborne illness can be seen in recent headlines. In August of this year 500 people were sickened and one child died as a result of an E. coli outbreak at a county fair near Albany, New York. Health officials there traced the outbreak to tainted drinking water at the fair.

According to Arizona Revised Statutes (A.R.S.) § 36-133 some of the responsibilities of the Public Health Department in establishing a chronic diseases surveillance system are to:

1. Provide a chronic disease information system.
2. Provide a mechanism for patient follow-up.
3. Monitor the incidence patterns of reporting diseases.
4. Establish procedures for reporting diseases.
5. Establish a data management system to perform various studies…and provide information to the medical community relating to diseases in the surveillance system.

Foodborne illnesses are just some of the communicable diseases that are tracked as part of this surveillance program.

In Maricopa County, Environmental Services Department also has some of the responsibility for the investigation of foodborne illnesses and administration of the Foodborne Illness Program. They are responsible for the permitting of all food handling facilities in the County. They will also investigate any reports of food poisoning or foodborne illness at any of those permitted facilities. Public Health and Environmental Services are notified of a foodborne illness incident in a variety of ways. They may be notified by a citizen who has a complaint about a food item. For example, a person buys meat from a supermarket and then gets sick from it; they may call Environmental Services and/or Public Health. Also, the Medical community has certain reporting requirements they must follow when they see a patient who is suffering from a foodborne illness.

Generally, Environmental Services handles the initial investigation of all potential foodborne illness that originated from a foodservice facility that they have issued a permit to. According to Environmental Services Policy and Procedures "*A foodborne complaint is any alert or complaint pertaining to foodborne illness; food spoilage; adulteration of a product; mislabeling; or an unsanitary establishment where conditions may attribute to the occurrence of a foodborne illness."* If the case of foodborne illness affects 2 or more people it is considered an outbreak and is then forwarded to the Public Health Department. Currently, Public Health does not routinely act on these cases unless it is a large outbreak and/or involves a more serious illness. According to Environmental Services and Public Health records, in 1998, less than 10 outbreak cases involving 350 individuals were referred to them by Environmental Services for investigation. According to Public Health,

none of these outbreaks were investigated due to staff shortages and the less serious nature of the cases. The general criteria for determining the priority in which cases will be investigated are as follows:

1. Communicability - the ease and speed of transmission from one individual to another
2. Source - Public source (i.e. nursing home, restaurant, day care facility) versus private (home)
3. Seriousness of illness - likelihood of death or permanent debilitation
4. Number individuals involved - outbreak or individual occurrence

Discussion:

Current Workload:

The following table is based on information provided by the Epidemiology Section of the Public Health Department.

Public Health Food Borne Illness Investigations		
	CY 1997	**CY 1998**
# Of Cases Identified	**2,962**	**2,221**
# Of Cases Investigated	**2,228**	**1,672**
% Of Cases Investigated	**75%**	**79%**
# Outbreaks Cases Referred	**8**	**8**
# Outbreaks Cases Investigated	**0**	**0**

According to Public Health estimates, there were 4,000 total cases of foodborne illness occurrences in Maricopa County in FY 1997. As shown in the tables above only 2,962 were actually reported. Of those reported, Public Health investigates between 75-80%. Having additional staff will not immediately effect the number of cases reported, but will impact the number investigated.

Before a decision can be made on how many staff members are needed to investigate every complaint of foodborne illness, two other questions must be answered. First is "Does every case of foodborne illness need to be investigated?" and second, "What level of education and training is required for an effective investigator?"

In an article in the October-December 1997 issue of Emerging Infectious Diseases, written by Robert V. Tauxe, of the Centers for Disease Control and Prevention in Atlanta, the author states "Every year, in the United States foodborne infections cause millions of

illnesses and thousands of deaths; most infections go undiagnosed and unreported. Preventing foodborne disease is a multifaceted process, without simple and universal solutions. The general strategy of prevention is to understand the mechanisms by which contamination and disease transmissions can occur well enough to interrupt them. ***An outbreak investigation or epidemiological study should go beyond identifying a suspected food and pulling it from the shelf*** to defining the chain of events that allowed contamination with an organism in large enough numbers to cause illness. Therefore, ***the sources of sporadic cases must also be investigated and understood***."

According to information provided by Public Health, in 1997, 189 ***confirmed*** cases of Salmonella and 328 cases of Hepatitis A were **not** investigated by Public Health. Nearly all these reports came from reports furnished by the Arizona State Department of Health Services Laboratory and are on cases usually weeks old. The values of conducting an investigation then is to determine the sources of the foodborne illness, provide education and training on those causes and hopefully prevent future occurrences of illness. Nearly 100% of all cases reported to Public Health are confirmed to be a foodborne illness.

Environmental Services investigated 241 of 868 reported cases in 1998. These cases are usually unconfirmed foodborne illness complaints from the general public. Generally, Environmental Services won't conduct a full investigation unless the illness can be traced to a food service establishment. If the apparent cause of illness is improperly handled food in the home an investigation will not normally be conducted.

During the course of conducting research for this report OMB talked to representatives of the following departments:

Maricopa County Department of Public Health
Maricopa County Department of Environmental Health Services
Orange County Department of Public Health
Clark County (Las Vegas) Department of Public Health
San Diego County Department of Public Health
San Diego County Department of Environmental Health Services
California Department of Health Services

Health officials in San Diego and Orange Counties indicated a more symbiotic relationship between Public Health and Environmental Services than exists in Maricopa County. While all these other jurisdictions provided a great deal of background information, they do not necessarily provide a good basis for comparison in terms of number of cases investigated versus number of staff. However, all agreed that foodborne illness investigation was a critical part of what a public health organization should provide. Based on testimony from these health professionals and additional articles from CDCP and others, it is reasonable to conclude that all ***confirmed*** cases of foodborne illnesses should be investigated, and that there is a public benefit for doing so.

One of the key points brought up by Public Health in their request for additional staffing is that a surveillance nurse is a key component of the overall communicable disease program. According to Public Health, a surveillance nurse conducts the follow-up interviews of the patient or doctor to determine whether or not the symptoms meet clinical definitions for a foodborne illness, to review data from laboratory tests and if necessary, go to a patient's home to examine the patient. Public Health maintains that the surveillance nurse should be the principal investigator on confirmed cases of foodborne illness.

For example, during a recent outbreak in the Maricopa County Jail, Environmental Services was the primary investigative agency. One of the basic questions was what was the address of the individuals affected? According to Public Health, the address listed in every case was the address of the jail. What really was needed was the individual pod and cell numbers to help in determining commonalties between those affected. Public Health indicates a Surveillance Nurse would have known to ask for that data.

Public Health states that while communicable disease investigators are qualified to conduct the initial investigations and interviews, they lack the medical training needed to fully evaluate the situation. The table below compares the costs of a Surveillance Nurse to a Communicable Disease Investigator and an Environmental Health Specialist.

Position	Total Cost Per F.T.E.
Surveillance Nurse	$43,833
Communicable Disease Investigator	$30,703
Environmental Health Specialist	$38,923

The primary duties of an Environmental Health Specialist are to inspect and investigate food-handling facilities for compliance with environmental/public health rules and regulations. Duties also include performing environmental testing, sampling, and monitoring; conducting environmental studies and surveys, and advising and educating the public about environmental and public health issues. The experience and education level required includes certification as a Registered Sanitarian and a Bachelor's Degree with 30 semester hours of science.

The main functions of a Surveillance Nurse are to receive, review, and prioritize incoming communicable disease reports for investigation and/or intervention; to investigate cases, conduct interviews, complete appropriate forms, and disseminate health education, counseling and recommendations to prevent further spread in the community. The Surveillance Nurse must have a Bachelor's Degree in Nursing and be a State Registered Nurse (RN).

The primary duties of the Communicable Disease Investigator is to conduct telephone interviews, keep records, and assist the Surveillance Nurse in communicable disease investigations.

The duties and responsibilities of an Epidemiologist include producing reports on natality, morbidity and mortality surveillance data; analyze data using statistical analysis techniques, and provide the help with outbreak investigation. Education requirements are a Master of Science Degree in Epidemiology or Biostatistics.

Currently, Public Health has 3.33 F.T.E's assigned to the foodborne illness program.

- Two Surveillance Nurses
- One CDI
- .33 Epidemiologist

Conclusion:

- Normally, a cost-benefit analysis is a major part of any budgetary research report. There are instances where the value per dollar spent may not be readily apparent. This issue is one of those. Foodborne illness is a very serious public health issue. According to statistics provided by CDCP and Public Health, in 1998, 76 million Americans suffered from a foodborne illness. Of those 325,000 required hospitalization and 5,000 died as a result of the illness.

- In 1998, the number of foodborne illness cases identified in Maricopa County was 80 cases per 100,000 in population. The number of patients hospitalized in Maricopa County due to foodborne illness was not available at the time of this report. In 1998, there were 3 deaths attributed to a foodborne illness in Maricopa County, which is a rate of 0.11 per 100,000 of population.

- Environmental Services and Public Health both play a vital role in the investigation of Foodborne Illnesses.

- All ***confirmed*** cases of foodborne illnesses should be investigated.

- Additional staff is required by Public Health to investigate all confirmed cases of foodborne illness.

- Most of the foodborne illness cases reported to Public Health are based on laboratory reports from the Arizona Department of Health Services. The individuals involved have already received medical treatment. In these cases the addition of CDI's and Epidemiologist are more cost effective than Surveillance Nurses with just as great a return.

- Research indicates that increased public education and awareness of the causes and consequences of foodborne illness will ultimately result in a decrease in the number of foodborne illness incidents.

Recommendation:

- Based on the preceding conclusions, OMB recommends the following additional staff :

- In it's initial request Public Health indicated that 2.7 F.T.E's were needed to fully staff the Foodborne Illness program. OMB concurs with that request.

- The addition of one F.T.E. each Surveillance Nurse, Communicable Disease Investigator, and .66 Epidemiologist, will significantly increase the foodborne illness staff. This staff increase should ensure Public Health is able to investigate **all** reported cases of foodborne illness.

Description	FY 00/01 (Annualized Costs)
1 - Surveillance Nurse	43,833
.66 - Epidemiologist	$29,810
1 - Communicable Disease Investigator	$30,703
2.66 Total F.T.E.'s	$104,346

- The full year impact of the new positions is $104,346. The $50,000 that was allocated earlier was used to partially fund a Nurse Manager to oversee the Communicable Disease Surveillance Program. Of the remaining $54,346 (annualized) half ($27,173) would be allocated during this fiscal year.

- Any ancillary equipment (i.e. computers) needed to support recommended staff be funded from existing budget.

- Additional study is needed to examine the relationship between Public Health and Environmental Services. There appears to be an overlap of duties and further study may identify some areas where resources may be shared and some cost savings realized.

Performance Measures

- Ideally, investigating all foodborne illness cases would result in a number of positive outcomes. These would include a reduction in the number of foodborne illness cases reported, and a decrease in the number hospitalizations and deaths from foodborne illnesses. However, the Public Health Epidemiology staff currently can't accurately measure the effects of increased investigations.

- With the addition of staff to the Foodborne Illness program, expectations would be that **100%** of confirmed cases of foodborne illness are investigated. If that workload measure is fulfilled, then those positive outcomes should ultimately result.

[1] Janet Collins, American Meat Institute in an article from **Emerging Infectious Diseases**, Volume 3 Number 4 October-December 1997.

[2] As defined by James A. Lindsey of the University of Florida, Gainesville, FLA in an article from **Emerging Infectious Diseases**, Volume 3 Number 4 October-December 1997.